The Epidemiology of Diabetes in Mississippi

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Executive Summary

In Mississippi, diabetes has become an important public health problem. It is a major cause of morbidity, disability, and mortality and a major source of health care costs.

C   More than 225,000 residents are now estimated to have diabetes; one third of them are undiagnosed.

C   Diabetes contributes to the deaths of an estimated 1,600 residents each year (probably a gross underestimate).

    <   Diabetes is responsible for a considerable amount of premature mortality, particularly in nonwhites

C   An estimated 1,700 Mississippians (probably also an underestimate) suffer significant diabetes-related complications each year, including:

    <   approximately 950 lower extremity amputations

    <   approximately 450 new cases of end-stage renal disease

    <   more than 300 new cases of blindness

C   Diabetes is also an important risk factor for coronary heart disease, stroke, and various complications of pregnancy.

C   More than 700,000 persons in Mississippi are at increased risk of undiagnosed diabetes because of being overweight and/or having a sedentary lifestyle. About 10% of these persons already have undiagnosed diabetes, and many more are at risk of developing diabetes in the future.

C   In 1996, the direct (medical care) and indirect (lost productivity and premature mortality) cost of diabetes in Mississippi was estimated to be about $1.6 billion.

Definitions and Classification of Diabetes

Definitions and classification of diabetes

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. The classification of diabetes was revised in 1997.[1] Four types are now recognized:

1. Type 1 diabetes was previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 may account for 5% to 10% of all diagnosed cases of diabetes. Risk factors are less well defined for type 1 diabetes than for type 2 diabetes, but autoimmune, genetic, and environmental factors are involved in the development of this type. Lack of insulin production by the pancreas makes type 1 diabetes particularly difficult to control. Treatment requires a strict regimen that typically includes a carefully calculated diet, planned physical activity, home blood glucose testing several times a day, and multiple daily insulin injections.

2. Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. Type 2 may account for about 90% to 95% of all diagnosed cases of diabetes. Risk factors for type 2 include older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, and race/ethnicity. African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans and Pacific Islanders are at particularly high risk for type 2 diabetes. Treatment typically includes diet control, exercise, home blood glucose testing, and in some cases, oral medication and/or insulin. Approximately 40% of people with type 2 require insulin injections.

3. Gestational diabetes develops in women in 2% to 5% of all pregnancies but disappears when the pregnancy is over. It occurs more frequently in African Americans, Hispanic/Latino Americans, American Indians, and persons with a family history of diabetes. Obesity is also associated with higher risk. Women who have had gestational diabetes are at increased risk for later developing type 2 diabetes. In some studies, nearly 40% of women with a history of gestational diabetes developed diabetes in the future.

4. "Other specific types" of diabetes result from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illnesses. Such types may account for 1% to 2% of all diagnosed cases.

Changes in diagnostic criteria

The diagnostic criteria for diabetes were revised in 1997.[1] The routine diagnostic test is now a fasting plasma glucose test rather than the previously preferred oral glucose tolerance test. (However, in certain clinical circumstances, physicians may still choose to perform the more difficult and costly oral glucose tolerance test.) A confirmed fasting plasma glucose value greater than or equal to 126 milligrams/ deciliter (mg/dL) indicates a diagnosis of diabetes.* Previously, a value greater than or equal to 140 mg/dL had been required for diagnosis. In the presence of symptoms of diabetes, a confirmed nonfasting plasma glucose value greater than or equal to 200 mg/dL indicates a diagnosis of diabetes.

When a doctor chooses to perform an oral glucose tolerance test (by administering 75 grams of anhydrous glucose dissolved in water, in accordance with World Health Organization standards, and then measuring the plasma glucose concentration 2 hours later), a confirmed glucose value greater than or equal to 200 mg/dL indicates a diagnosis of diabetes.

Impaired fasting glucose

Impaired fasting glucose is a new diagnostic category in which persons have fasting plasma glucose values of 110-125 mg/dL. These glucose values are greater than the level considered normal but less than the level that is diagnostic of diabetes. It is estimated that approximately 7.0% of the population have impaired fasting glucose. Scientists are trying to learn how to predict which of these persons will go on to develop diabetes and how to prevent such progression.

* Note:
(a) Except in certain specified circumstances, abnormal tests must be confirmed by repeat testing on another day.
(b) In pregnant women, different requirements are used to identify the presence of gestational diabetes.

Data Sources and Methods

Data sources

Mortality data

Mortality numbers and rates due to diabetes (ICD-9 code N250) are based on death certificate data provided by the Bureau of Public Health Statistics, Mississippi State Department of Health (MSDH) and also available through CDCs WONDER system at http://wonder.cdc.gov. A diabetes-related death is one where diabetes is listed as the primary or underlying cause of death. It should be remembered that there are a number of problems related to the reliability and validity of cause-of-death data on death certificates, and there is likely considerable underreporting of mortality attributable to diabetes.[2]

Prevalence estimates

In this report, prevalence estimates are based on self-reported data from the Mississippi Behavioral Risk Factor Surveillance System (MS-BRFSS).[3] The MS-BRFSS is a continuous, statewide, random-digit-dialed telephone survey of a representative sample of the Mississippi civilian non-institutionalized adult population (18 years of age and older). Respondents are asked: "Have you ever been told by a doctor that you have diabetes?" Persons reporting "borderline" diabetes are included; from 1994 on, persons with gestational diabetes are excluded. The overall sample size for 1990-97 varied between 1,578 and 1,599 persons; in 1998, this was increased to 2,307 persons. The number of diabetics sampled each year has ranged from 103 to 117 between 1990 and 1997, and increased to 185 in 1998. (Note: no statewide data are available on the prevalence of diabetes in children and adolescents (ages 0-17 years)).

An additional 12-question diabetes module (Appendix 1) has been included in the MS-BRFSS for three consecutive years (1996, 1997, and 1998). This module provides data on diabetes complications and management. Because of the small number of diabetics sampled in any one year, data from 1996 and 1997 have been pooled to provide more precise and stable estimates. The diabetes module will continue to be administered in alternate years, beginning in 2000.

Diabetes prevalence estimates for other states in the U.S. were obtained from the BRFSS website   at http://www.cdc.gov/nccdphp/brfss.

The MS-BRFSS also collects data on self-reported weight and height, from which body mass index (BMI) can be calculated, and on exercise patterns. These data can be used to generate estimates of the number of adults at risk of developing type 2 diabetes. These estimates will be conservative as no data are available on family history of diabetes or birth weight of children, which are additional factors that can be used to determine risk of developing type 2 diabetes.

Validity and reliability of self-reported surveillance data

Although BRFSS data are self-reported, the validity and reliability of this method of surveillance have been well established for many chronic diseases and risk behaviors, including diabetes and BMI.[4-6] The validity and reliability of self-reported data on diabetes and BMI are good, though underreporting of weight tends to occur. Validity and reliability of the BRFSS diabetes module questions are still being determined.

BRFSS prevalence estimates compared to national prevalence estimates

Diabetes prevalence estimates from the BRFSS are state-specific estimates and differ slightly from the "synthetic" estimates based on national data derived from the National Health Interview Survey (NHIS), which is a national household survey. One major reason for the difference is that the BRFSS is conducted in persons 18 years and older while the NHIS is conducted among persons of all ages. Since the BRFSS samples adults only (thus reducing the denominator disproportionately), the total state-aggregate estimate of the prevalence of diagnosed diabetes is higher than that of the NHIS national estimate. However, even when the NHIS national diagnosed diabetes prevalence estimate is restricted to persons 18 years and older, it is still lower than the BRFSS state-aggregate prevalence estimate. In the early 1990s, the BRFSS estimate of diagnosed diabetes prevalence was about 25% higher than the NHIS diagnosed diabetes prevalence among persons 18 years of age and older. Differences in survey methodology likely account for most of this difference.

Other data sources

Information and Quality HEALTHCARE (IQH), the Medicare Peer Review Organization for the state, collects claims data on the Medicare population in Mississippi. From this, data on diabetes-related procedures, lower extremity amputation (LEA), and treatment for end-stage renal disease (ESRD) in persons 65 years of age and older can be obtained. IQH supplied data on LEA for 1995 and collaborated with MSDH on a survey of diabetes management performance indicators in primary care clinics in the state.[7]

Network-8, Inc. maintains a register of ESRD/dialysis cases and supplied data on incident cases of ESRD/dialysis. A preliminary analysis of ESRD/dialysis incidence data for the period 1992-1998 has been published.[8]

The database of the Physician Insurers Association of America (PIAA) can be used to monitor diabetes-related malpractice claims in the state. Data for the period 1985-1996 have been analyzed and published.[9] It remains to be determined whether this database will be useful in the future as a diabetes surveillance tool.

There is no statewide diabetes register in Mississippi. Such a register would be costly and labor-intensive to develop and maintain, and would be justified primarily by the need to obtain data on diabetes incidence rates and patterns in the state. However, the priority of diabetes control and prevention activities in Mississippi at the present time is surveillance to determine the extent of disease and to identify groups and areas with the greatest burden of disease. For this purpose, prevalence estimates are sufficient.

Mississippi also lacks a statewide hospital discharge data system. Although this would be a useful source of data on diabetes-related procedures such as LEA, much diabetes care now takes place outside hospital in primary care settings.

Methods

Crude mortality rates are calculated using number of deaths as the numerator and mid-year population estimates for the state from the U.S. Census Bureau (http://www.census.gov) as the denominator. Crude rates are age adjusted using the 1990 U.S. population. For 1998, only numbers of new cases are given; rates are not yet available.

Prevalence and mortality rates over time have been smoothed where appropriate, using a combination of median smoothing and Hanning moving average,[10] so that trends can be more easily seen.

Note on race categories

The two categories of race used in this report are "white" (W) and "nonwhite" (NW). "White" includes such groups as Caucasian, Anglo-American, Canadian, Cuban, French, Greek, Hispanic, Latin American, Mexican, Puerto Rican, Swedish, etc. 'Nonwhite" includes such groups as Black, African-American, American Indian, Chinese, Japanese, Hawaiian, Filipino, and all other groups not considered as white. In Mississippi, the population distribution by race is approximately 63% white, 36% black (African American), and 1% other races (largely Asian/Pacific Islander and American Indian).[11] The category nonwhite can therefore be considered synonymous with African-American in this report. The number of persons in the "other" race category is too small for a separate analysis.

The following abbreviations have been used: WM=white male; NWM=nonwhite males; WF=white females; NWF=nonwhite females.

Diabetes Prevalence in Mississippi

Diabetes prevalence

In 1998, the latest year for which data are available, the prevalence of self-reported diabetes was 7.6%, an increase of 1.5 percentage points from 1997 (Table 1). Approximately 150,000 persons in Mississippi are estimated to have *diagnosed* diabetes, and a further 75,000 persons can be estimated to have *undiagnosed* diabetes.[12] Therefore, the estimated total number of persons with diabetes in the state is 225,000.

Table 1. Prevalence of self-reported diabetes by year, Mississippi, 1990-98.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Prevalence (%)	6.9	7.0	6.6	6.3	5.7	6.4	6.1	6.1	7.6
Adjusted* prevalence (%)	6.5	6.6	6.2	5.9	5.7	6.4	6.1	6.1	7.6

*Note: prior to 1994, prevalence data included gestational diabetes in the overall rate, which increases the figure by approximately 0.4%. From 1994 on, the prevalence figure excludes gestational diabetes. The adjusted prevalence takes this into account. None of these estimates is age adjusted.

After adjusting the 1990-93 prevalence figures to exclude gestational diabetes, there appears to be no significant trend between 1990 and 1997 (Table 1 and Figure 1). It remains to be seen whether or not the increase in 1998 is the start of an upward trend.

Figure 1. Prevalence of self-reported diabetes by year, Mississippi, 1990-98.
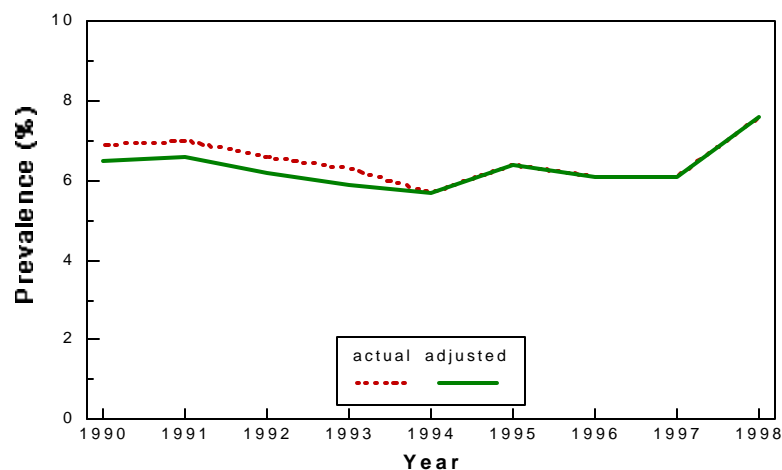
In 1998, Mississippi had the third highest diabetes prevalence in the U.S., with a rate that was nearly three times that of Arizona, the state with the lowest prevalence (Table 2). The median prevalence in the U.S. in 1998 was 5.4%.

Table 2. States with the highest and lowest prevalence of self-reported diabetes, U.S., 1998.

States with the highest prevalence in 1997	Diabetes prevalence (%)		States with the lowest prevalence in 1997	Diabetes prevalence (%)
Puerto Rico	9.4		Wyoming	3.7
Oklahoma	7.8		Maine & Montana	3.6
Mississippi	7.6		South Dakota	3.1
D.C.	7.1		Alaska	3.0
Alabama & Michigan	7.0		Arizona	2.8

Prevalence by age, race, and gender

Over the period 1996/97, the average prevalence of self-reported diabetes was 5.5% in males, 6.6% in females, 5.0% in whites, and 8.2% in nonwhites (Table 3). Overall, the prevalence is about 20% higher in women. There is a marked difference in prevalence between whites and nonwhites, with the nonwhite prevalence being about 60% higher. The highest average prevalence was in NWF (8.8%), followed by NWM (7.5%), WF (5.5%), and WM (4.5%). Further details for each year 1990-98 are given in Appendix 2, Tables A2a - A2i.

Distribution of cases of self-reported diabetes, Mississippi, 1996/97

C   94% of all adult diabetics are $35 years of age
C   86% of all adult diabetics are $45 years of age
C   40% of all adult diabetics are $65 years of age
C   54% of all adult diabetics are white

Table 3. Number and percentage of adults (18 years of age and older) with self-reported diabetes, by age group, race, and gender, Mississippi, 1996/97.

Variable	Categories	Sample N*	Weighted N*	Weighted prevalence (%)	95% CI^
All	--	218	237,239	6.1	5.1-7.1
Age group	25-34	10	13,446	1.7	0.5-2.9
	35-44	18	20,897	2.7	1.1-4.3
	45-54	46	53,711	8.6	6.0-11.2
	55-64	53	55,486	12.8	9.2-16.4
	65+	91	93,717	13.3	10.3-16.3
Gender	Male	67	99,772	5.5	4.1-6.9
	Female	151	137,485	6.6	5.4-7.8
Race	W	119	127,854	5.0	4.0-6.0
	NW	99	109,402	8.2	6.4-10.0
Race by gender	WM	40	55,010	4.5	3.1-5.9
	NWM	27	44,762	7.5	4.3-10.7
	WF	79	72,844	5.5	4.1-6.9
	NWF	72	64,641	8.8	6.6-11.0

* aggregate data for two years   ^CI=confidence interval

In all race/gender groups there is a marked increase in prevalence after the age of 45 years. The highest prevalence is found in nonwhite women aged 55-64 years, who have a rate (29.1%) that is nearly four times the prevalence in white women in the same age group (7.8%) (Figure 2).

Figure 2. Prevalence of self-reported diabetes by race and gender, Mississippi, 1996/97.
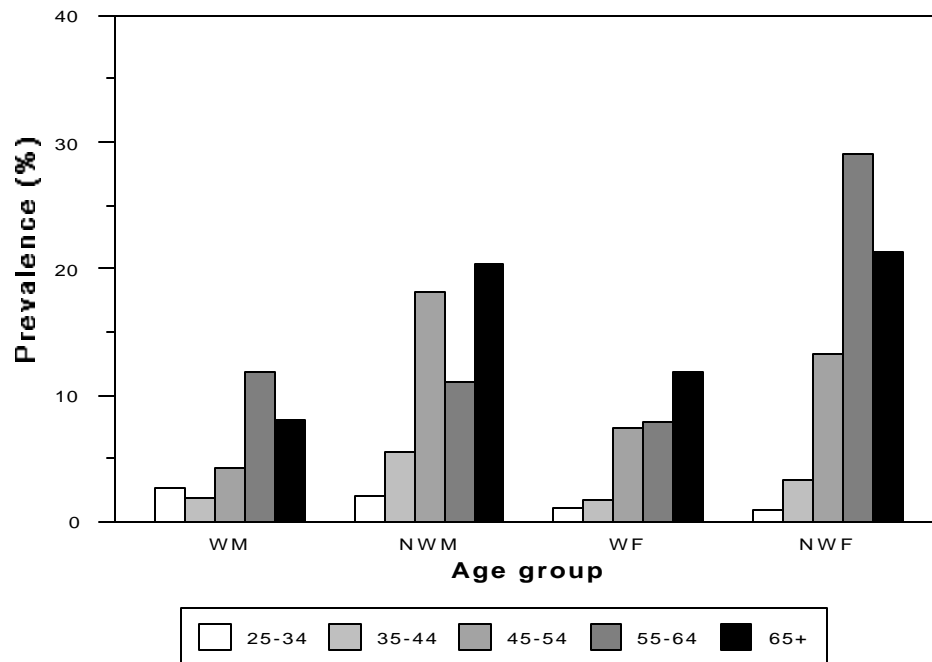
Trends over time

The trend in prevalence rates for the main population groups (Table 4) is difficult to discern because of year-to-year fluctuations (the result of small sample sizes). After adjusting the 1990-93 prevalence figures to exclude gestational diabetes and smoothing the data, the prevalence over the period 1990-98 appears to be increasing for WM and WF, but remaining stable for NWM (Figure 3). Rates for NWF are increasing again after years of decline.

Table 4. Prevalence of self-reported diabetes by race and gender, by year, Mississippi, 1990-98.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
WM	3.9	5.3	2.6	5.8	5.3	3.3	5.7	3.3	7.3
NWM	7.5	3.8	7.1	4.7	6.2	5.1	6.1	8.9	6.1
WF	5.8	5.5	7.7	5.8	3.3	5.4	4.9	6.1	6.7
NWF	13.7	15.4	11.6	9.7	10.6	14.7	9.1	8.5	10.7

Note: None of these estimates is age adjusted.

Figure 3. Prevalence of self-reported diabetes by race and gender, by year, Mississippi, 1990-98.
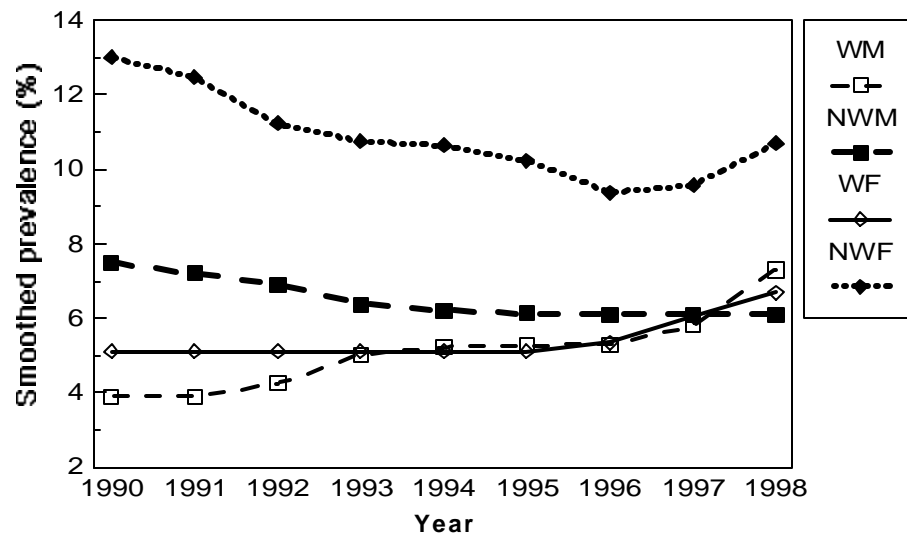
The prevalence of self-reported diabetes varies markedly by county (Appendix 3), ranging from 0-19%. Caution should be exercised when interpreting these county prevalence figures, however. Even after aggregating two years of data (total N=3,191), the number of respondents in many of the counties is small, and the number of persons reporting that they have diabetes is even smaller. This makes the prevalence rates unreliable. (For this reason, prevalence rates were not calculated for counties with a sample size smaller than an arbitrary minimum of 20)

Further details of the BRFSS sample of diabetics - age of onset, percent requiring insulin, and prevalence by selected characteristics - are given in Tables 5 and 6.

Table 5. Frequencies of self-reported diabetes and diabetes-related questions by race and gender, Mississippi, 1996/97. All numbers are %* unless indicated otherwise (95% CI^).

Variable	Categories	All	WM	NWM	WF	NWF
Diabetes (told by a doctor)	--	6.1 (5.1-7.1)	4.5 (3.1-5.9)	7.5 (4.3-10.7)	5.5 (4.1-6.9)	8.8 (6.6-11.0)
Mean age of onset (yrs.)	--	51.8 (49.2-54.4)	51.7 (46.5-56.9)	52.5 (48.5-56.5)	48.1 (40.3-55.9)	53.5 (49.5-57.5)
Age group of onset	0-14 yrs.	4.2 (0.8-7.6)	5.9‡	6.6‡	5.2‡	0‡
	15+ yrs.	86.5 (81.1-91.9)	84.6 (73.0-96.2)	87.1 (70.3-)	86.3 (78.1-94.5)	87.8 (79.6-96.0)
	0-29 yrs.	7.0 (3.0-11.0)	10.3‡	6.6‡	7.8 (1.8-13.8)	3.6‡
	30+ yrs.	83.7 (77.9-89.5)	80.2 (67.4-93.0)	87.1 (70.3-)	83.7 (74.7-92.7)	84.3 (75.7-92.9)
	0-39 yrs.	21.6 (14.8-28.4)	16.6 (4.4-28.8)	33.7 (11.5-55.9)	18.7 (8.9-28.5)	20.8 (10.2-31.4)
	40+ yrs.	69.0 (61.4-76.6)	73.9 (59.7-88.1)	60.0 (37.4-82.6)	72.8 (61.4-84.2)	67.0 (54.2-79.8)
	0-64 yrs.	76.8 (71.0-82.6)	75.5 (61.5-89.5)	80.0 (63.4-96.6)	75.9 (65.9-85.9)	76.9 (66.1-87.7)
	65+ yrs.	13.8 (6.0-19.6)	15.0 (3.2-26.8)	13.7‡	15.6 (7.6-23.6)	10.9 (2.7-19.1)
Need insulin	--	38.4 (30.8-46.0)	32.8 (16.8-48.8)	41.1 (19.3-62.9)	40.1 (27.5-52.7)	39.5 (27.3-51.7)

* percentages in "Don't know" category are not shown
^ CI=confidence interval   ‡ CI boundary lies outside the range 0-100

Table 6. Percentage of adults (18 years of age and older) with self-reported diabetes, by selected characteristics, Mississippi, 1996/97.

| Variable	Categories	Sample N*	Weighted N*	Weighted prevalence (%) of diabetes	95% CI^
Education	Less than high school	95	96,950	11.7	9.1-14.3
	High school graduate	57	66,874	5.3	3.7-6.9
	More than high school	66	73,415	4.1	3.1-5.1
Annual income	< $24,000	137	141,671	9.2	7.4-11.0
	$24,000-49,999	32	38,720	3.4	2.2-4.6
	> $50,000	18	25,354	3.9	2.1-5.7
Employed	Yes (wages, self-employed, homemaker, student)	79	89,546	3.2	2.4-4.0
	No (out of work, unable, retired)	139	147,693	14.2	11.6-16.8
Any health care coverage	Yes	189	202,040	6.1	5.1-7.1
	No	29	35,198	6.2	3.6-8.8
Could not afford to see a doctor	Yes	49	56,551	9.7	6.7-12.7
	No	169	180,687	5.5	4.5-6.5

* aggregate data for two years   ^CI=confidence interval

Number of persons at risk of developing type 2 diabetes in Mississippi

The major risk factors for developing type 2 diabetes (the predominant form of diabetes) are age ($45 years), being overweight (BMI $27.8 (men) / $27.3 (women), equivalent to being 20% or more above ideal weight for height), and having a sedentary lifestyle (no physical activity or activities that are done for 20 minutes or less, three or fewer times per week).[13] The most important risk factor is overweight: 80% of type 2 diabetics are overweight at the time of diagnosis, and type 2 diabetes is three times as common in persons who are at least 40% overweight. Mississippi continues to have the highest prevalence of self-reported overweight in the nation, and one of the highest rates of self-reported sedentary lifestyle in the nation. In 1998, approximately 36% of adult Mississippians were overweight, and in 1996, approximately 65% failed to maintain adequate levels of exercise. Since 1990, there has

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been an increase of almost 10 percentage points in the prevalence of self-reported overweight in the state, a relative increase of 37% (Figure 4).

Figure 4. Prevalence of adult overweight by year, Mississippi, 1990-98
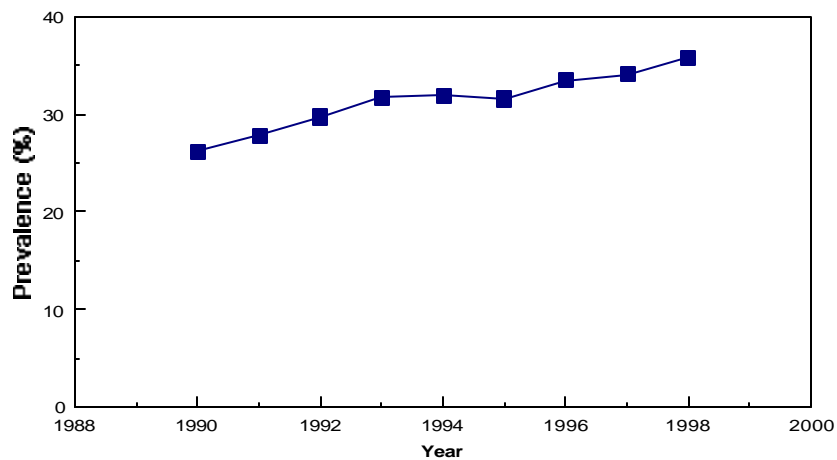
Using data from the 1998 MS-BRFSS on age distribution, prevalence of overweight, and prevalence of sedentary lifestyle, it can be estimated that more than 735,000 persons in the state (approximately 37% of the population) are at risk of developing type 2 diabetes (Table 7).

Table 7. Estimated number of persons at risk of developing type 2 diabetes, Mississippi, 1996/97

Age group	Overweight	Sedentary	Overweight and sedentary	Total
20-44	---	---	204,312	204,312
45-64	79,005	182,489	154,668	416,162
65+	35,647	---	79,581	115,228
Total	114,652	182,489	438,561	735,702

Diabetes Mortality in Mississippi

Diabetes mortality

There were 628 deaths due to diabetes (that is, where diabetes is listed as the underlying cause of death) in 1998, making it the 7th leading cause of death in the state. The overall crude diabetes mortality rate in 1998 was 22.8 per 100,000. When the age-adjusted death rates for diabetes for the 50 states and the District of Columbia in 1997 are ordered from high to low, Mississippi's rate (20.4) ranked 34th, well below the rate in many other states (Table 8).

Table 8. Highest and lowest diabetes mortality rates,* U.S., 1997

States with highest mortality rates	Diabetes mortality rates per 100,000		States with lowest mortality rates	Diabetes mortality rates per 100,000
Louisiana	40.1		Nebraska	16.3
D.C.	33.6		Connecticut	16.0
West Virginia	30.3		Hawaii	16.0
Maryland	28.4		Nevada	15.6
Texas	28.3		Colorado	15.1

*age adjusted to the U.S. 1990 population

For both males and females, NW diabetes mortality rates are more than double the W rates (Figure 5).

Figure 5. Diabetes mortality rates by race and gender, Mississippi, 1998.

* age adjusted to the 1990 U.S. population
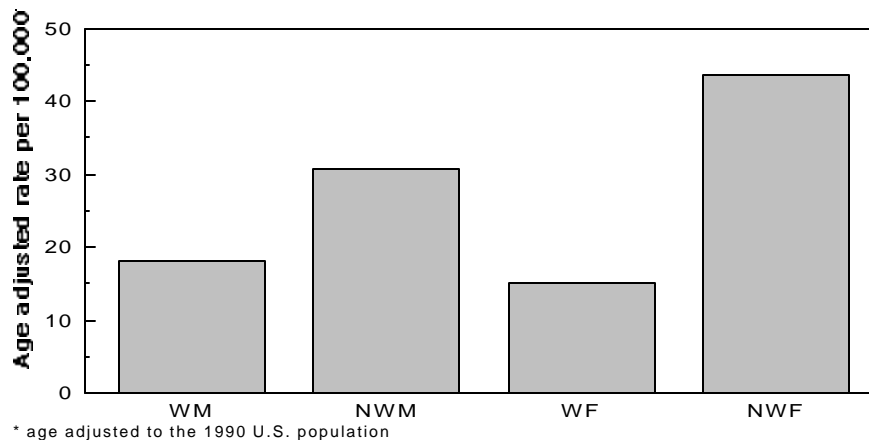
Distribution of diabetes deaths, Mississippi, 1998

C   85% of all diabetes deaths were in persons $55 years of age
C   69% of all diabetes deaths were in persons $65 years of age
C   53% of all diabetes deaths were in whites
C   61% of all diabetes deaths were in females

Trends over time

Both the number and rate of deaths due to diabetes increased over the period 1990-1998: deaths by
43% and mortality rates by 30% (Table 9 and Figure 6). Whether this represents a real increase in
mortality or more accurate death certification is not known.

Table 9. Deaths and mortality rates (per 100,000) where diabetes is the underlying diagnosis, by year,
Mississippi, 1990-98.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Deaths	440	432	475	488	498	489	538	571	628
Crude rate	17.1	16.7	18.2	18.5	18.7	18.2	19.8	20.9	22.8
AA rate*	17.3	16.7	18.3	18.4	18.5	18.1	19.7	20.4	22.5

* AA rate=age adjusted rate (age adjusted to the U.S. 1990 population)

Figure 6. Diabetes mortality rates by year, Mississippi, 1990-98.
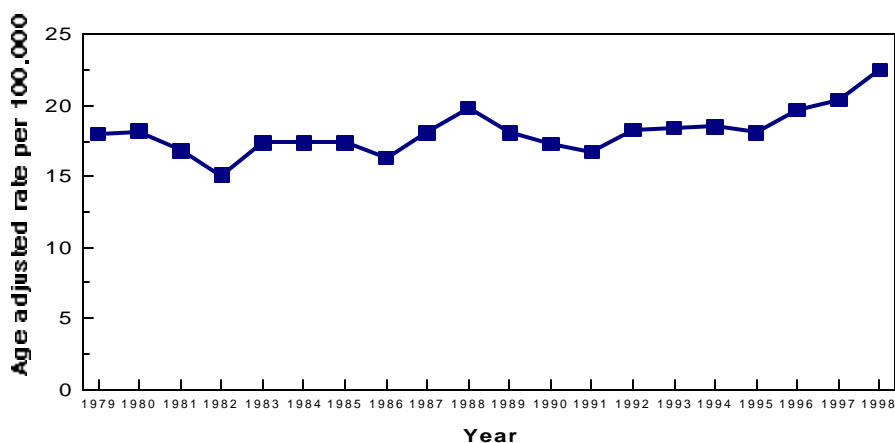
* age adjusted to the 1990 U.S. population

The trend in mortality rates for the main population groups (Table 10) is slightly erratic because of year-to-year fluctuations (the result of small numbers). After smoothing the data, the age adjusted mortality rates appear stable for NWM, show a slight upward trend for WM and WF, and show a more marked increase over the past several years for NWF (Figure 7).

Table 10. Diabetes mortality rates by race and gender, by year, Mississippi, 1990-98.

Year	Measure	1990	1991	1992	1993	1994	1995	1996	1997	1998
WM	No.	84	71	100	111	119	113	130	127	150
	Crude rate	10.5	8.9	12.5	13.7	14.6	13.7	15.7	15.2	17.9
	AA rate*	11.7	9.5	13.3	14.5	15.3	14.7	16.4	16.1	18.2
NWM	No.	75	68	92	92	94	69	85	113	94
	Crude rate	17.7	15.8	21.1	20.8	21.0	15.2	18.5	24.4	19.5
	AA rate*	26.5	23.4	31.9	31.7	32.4	22.8	29.1	37.1	30.8
WF	No.	138	119	137	120	131	161	142	172	183
	Crude rate	16.4	14.1	16.2	14.1	15.3	18.6	16.3	19.7	20.8
	AA rate*	12.4	10.6	12.2	10.2	10.8	13.5	11.7	14.2	15.2
NWF	No.	142	173	142	161	148	140	174	153	201
	Crude rate	28.8	34.8	28.2	31.7	28.8	26.9	33.1	28.8	36.5
	AA rate*	32.9	39.3	32.1	36.8	32.8	32.4	39.4	33.6	43.6

* AA rate=age adjusted rate (age adjusted to the U.S. 1990 population)

Excess deaths

Over the period 1990-97, there were 1,927 deaths due to diabetes among nonwhites 25 years of age and older. If diabetes mortality rates in whites had applied to nonwhites, the number of diabetes deaths would have totaled 737. Therefore, 1,190 of the diabetic deaths in nonwhites 25 years of age and older during this period can be considered 'excess'.

Figure 7. Diabetes mortality rates (smoothed) by race and gender, by year, Mississippi, 1990-98.

*age adjusted to the 1990 U.S. population
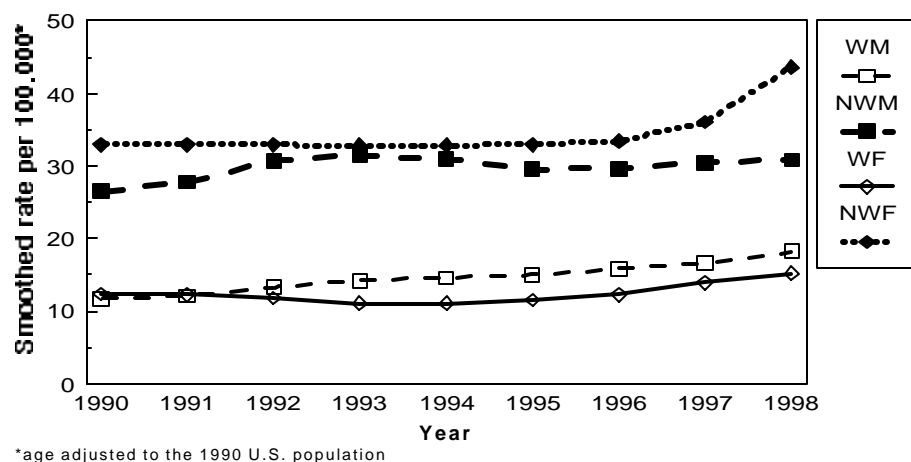
Years of Potential Life Lost (YPLL)* due to diabetes

In 1998, diabetes was responsible for 5,207 YPLL to age 75. Diabetes YPLL rates are markedly

higher (70%) for nonwhites compared to whites. Nonwhite males have diabetes YPLL rates that are

40% higher than those of white males; nonwhite female YPLL rates are double white female YPLL

rates (Table 11 and Figure 8). Thus, diabetes is responsible for a considerable amount of premature

mortality in Mississippi, particularly in nonwhites.

Table 11. YPLL$_{75}$ numbers and rates (per 100,000) due to diabetes by race and gender, Mississippi, 1998 [rates in parentheses].

	White	Nonwhite	Total
Males	1,411 (176.7)	1,161 (248.6)	2,572 (203.2)
Females	1,133 (140.0)	1,502 (286.4)	2,635 (197.5)
Total	2,544 (158.2)	2,263 (268.6)	5,207 (200.3)

*Years of potential life lost (YPLL) is a measure of the impact of premature mortality on a population. It is the sum of the differences between some predetermined end point and the ages of death for those who died before that end point. For example, using an end point of age 75, a person dying at age 65 has lost 10 years of potential life.

Figure 8. YPLL$_{75}$ rates (per 100,000) due to diabetes by race and gender, Mississippi, 1998
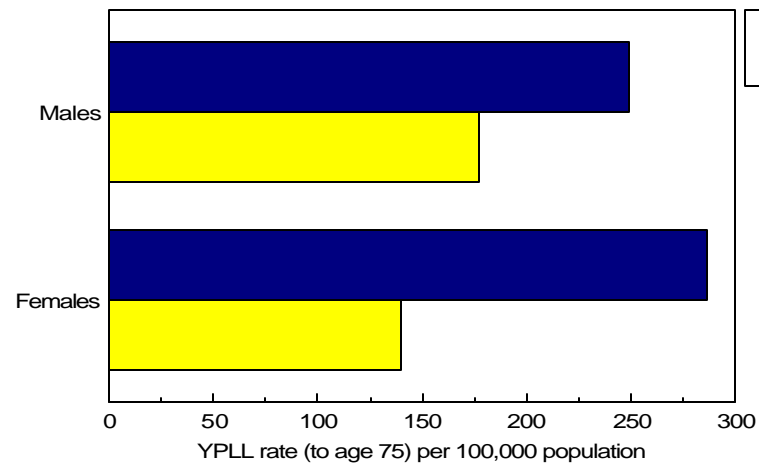
Diabetes Complications in Mississippi

Diabetes complications

Limited data are available on visual problems, end stage renal disease/dialysis, and lower extremity amputation due to diabetes. An estimated 1,700 Mississippians suffer significant diabetes-related complications each year, with approximately 950 lower extremity amputations, 450 new cases of end-stage renal disease, and over 300 new cases of blindness annually.

Foot problems/lower extremity amputation

The full extent of foot problems (poor circulation, pain, nonulcerative lesions, deformity/disability, infections/ulcers, gangrene, amputation) in persons with diabetes is unknown. State-specific data are limited to data on the Medicare population (65 years of age and older). In 1995 in this group, 294 nontraumatic lower extremity amputations (NTLEA) were performed where diabetes was coded as the primary diagnosis (this is almost certainly an undercount as underreporting of diabetes on hospital discharge forms is well-recognized, reaching 40% in some studies[14]). The overall NTLEA incidence rate in Mississippi for this population group was 10.7 per 1,000 diabetics (Table 12). This compared favorably with the national rate of 11.1.

Table 12. Diabetic NTLEA numbers and incidence rates in Medicare enrollees, Mississippi, 1995.

Race	Gender	Number of NTLEA	Rate / 1,000 diabetics
White	male	70	8.7
	female	61	5.0
	both	131	6.5
Nonwhite	male	54	17.9
	female	109	23.7
	both	163	21.6
Total	male	124	11.0
	female	170	10.4
	both	294	10.7

The average annual incidence rate for diabetic NTLEA in the Medicare population varies considerably across the state (Table 13).

Table 13. Incidence rates* of diabetic NTLEA in Medicare enrollees, by race, gender, and Public Health District, Mississippi, 1995.

Public Health District	WM	NWM	All Males	WF	NWF	All Females	All Whites	All Nonwhite	Total
1	3.5	5.1	4.2	1.0	35.2	8.7	1.9	23.4	8.7
2	5.9	37.5	10.3	8.1	32.3	11.3	7.4	34.7	11.3
3	1.6	14.6	7.3	1.7	9.2	6.3	1.6	11.6	6.3
4	8.1	31.3	14.2	8.3	32.5	14.8	7.8	32.4	14.8
5	13.1	12.0	12.3	4.1	16.9	10.3	7.8	15.0	10.3
6	10.2	30.6	15.8	4.1	43.1	15.5	6.8	37.8	15.5
7	10.9	11.7	10.8	4.5	19.5	10.5	6.9	16.7	10.5
8	8.8	20.9	11.3	5.2	12.4	8.9	6.8	16.4	8.9
9	10.5	18.3	11.5	5.0	45.5	10.6	7.2	33.9	10.6
State	8.7	17.9	11.0	5.0	23.7	10.4	6.5	21.6	10.7

* age-adjusted to the 1980 U.S. population

For all age groups, extrapolating from the national rates, between 892 and 984 diabetic NTLEAs would be expected each year in the state, including 509 in the 65+ age group (Table 14). The discrepancy between the estimates for the 65+ age group in Table 14 (509) and the numbers reported by IQH for the Medicare population in Table 12 (294) is probably largely due to the underreporting of diabetes on hospital discharge forms, as mentioned above.

Table 14. National diabetic NTLEA rates and estimated numbers for Mississippi.

Group	Gender	NTLEA rate / 1,000 diabetics	Estimated number of diabetics	Estimated number of diabetic NTLEAs
Overall		8.3	118,620	984*
Gender	Male	10.2	49,886	510
	Female	6.9	68,743	474
	Both			984*
Race	White	6.9	63,927	444
	Nonwhite	8.2	54,701	448
	Both			892*
Age	0-64	6.2	71,770	445
	65-74	8.8	30,458	268
	75+	14.7	16,400	241
	All			954*

*estimates vary slightly according to which data sources are used

End stage renal disease/dialysis

The leading cause of new cases of end stage renal disease (ESRD) requiring dialysis in Mississippi is diabetes (Table 15 and Figure 9). In 1998, it accounted for 460 (44.3%) of 1,039 new cases of ESRD/dialysis. Diabetes and hypertension account for the majority (approximately 75%) of new cases of ESRD/dialysis (Table 15 and Figure 9).

Over the period 1992-98, proportionately diabetes has increased and hypertension decreased slightly, though this varies by race/gender group: in males (especially NWM), hypertension is the leading cause, whereas in females (especially NWF) diabetes leads hypertension (see Tables A4a-A4d in Appendix 4).

Table 15. Distribution of new cases of ESRD/dialysis by cause (primary diagnosis by major category), by year, Mississippi, 1992-98. All figures are % (not age adjusted).

Cause	1992	1993	1994	1995	1996	1997	1998
Diabetes	36.9	35.4	38.2	40.2	45.3	42.0	44.3
Hypertension	36.8	36.7	39.7	31.9	30.7	34.0	32.5
Glomerulonephritis	14.0	14.3	11.3	9.8	9.2	10.3	10.4
Cystic disease	2.1	3.0	2.0	2.3	1.8	2.4	1.3
Other	10.2	10.6	8.9	15.9	12.9	11.3	11.5

Figure 9. Distribution of new cases of ESRD/dialysis by cause (primary diagnosis by major category), Mississipi, 1998. All figures are %.
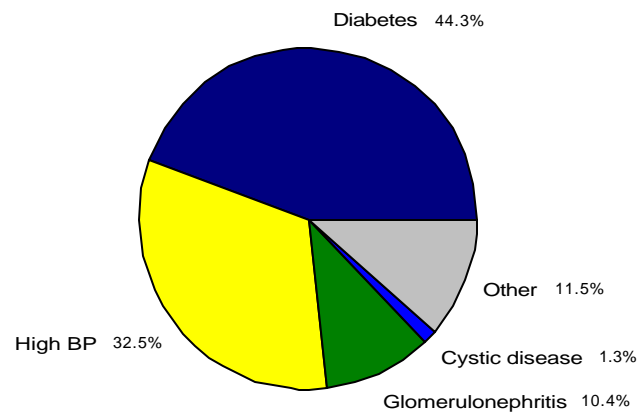
Visual problems due to diabetes

Of the 218 persons with diabetes in the 1996/97 BRFSS sample, 27.8% reported difficulty recognizing people or objects across the street all or most of the time, 22.7% reported difficulty reading print or numbers on the telephone all or most of the time, and 16.5% reported difficulty when watching television all or most of the time (Table 16).

Table 16. Visual problems reported by persons with diabetes, Mississippi, 1996/97.

Variable	Sample N*	Weighted N*	Weighted prevalence (%)	95% CI[†]
Difficulty recognizing people or objects across the street all or most of the time	61	65,925	27.8	21.0-34.6
Difficulty reading print or numbers on the telephone all or most of the time	52	53,845	22.7	16.3-29.1
Difficulty when watching television all or most of the time	34	39,101	16.5	10-7-22.3

* aggregate numbers for 2 years   [†] CI=confidence interval

Blindness due to diabetes

There is no blindness register in Mississippi, and reliable estimates of the incidence rate of blindness due to diabetes are lacking. However, extrapolating from incidence rate estimates from other sources, [15] the expected annual number of new cases of blindness due to diabetes can be estimated to range from 260 to 409.

Cardiovascular disease risk factors in persons with diabetes

The main cause of death in persons with diabetes is heart disease (especially ischemic heart disease); stroke incidence/mortality is also increased in persons with diabetes. Recently the National Heart, Lung, and Blood Institute, the National Institute of Diabetes and Digestive and Kidney Diseases, the American Heart Association, the American Diabetes Association (ADA) and the Juvenile Diabetes Foundation International released a joint statement emphasizing the role of diabetes as a major risk factor for cardiovascular disease (CVD).[16] The prevalence of the major CVD risk factors (cigarette smoking, high cholesterol, high blood pressure) can be compared in diabetics and nondiabetics (Table 17). The prevalence of current smokers is lower, and that of former smokers higher, in diabetics compared to nondiabetics. The prevalence of high blood pressure and high cholesterol level is higher in diabetics compared to nondiabetics.

Table 17. Prevalence of major CVD risk factors in diabetics and nondiabetics, Mississippi, 1997/98.

	Current smokers (1998)	Former smokers (1998)	High blood pressure (1997)	High cholesterol level (1997)
Diabetics	20.3%	30.2%	71.1%	45.2%
Nondiabetics	24.2%	20.9%	31.8%	27.1%

Diabetes management performance indicators

Many of the complications of diabetes can be prevented or limited by appropriate and timely interventions, yet many people with diabetes may not be receiving medical care that meets published standards and guidelines.[17] Limited data on diabetes knowledge and care practices in Mississippi are available from the diabetes module of the MS-BRFSS and the 1997 IQH/MSDH survey of primary care providers.

Data are available on the following performance indicators: annual number of visits to a physician; percent of respondents who have heard of HgA1c; frequency of HgA1c checks; frequency of foot exams (or referral for a foot exam); frequency of (dilated) eye exams (or referral for an eye exam); frequency of screening for albuminuria / proteinuria; frequency of checking lipid profile/cholesterol level; percent of respondents receiving treatment with ACE inhibitors when proteinuria diagnosed.

Results from the MS-BRFSS

The results are summarized in Table 18. The categories for each variable have been chosen arbitrarily and do not necessarily indicate an optimum target for patient management. The plan of management will vary from patient to patient and from time to time, and it is not realistic to set a single set of performance goals for all patients. The ADAs 1999 Clinical Practice recommendations [17] reflect this necessary flexibility.

Table 18. Self-reported frequencies of diabetes-related questions, by race and gender, Mississippi, 1996/97. Numbers are % (95% CI[†]).

Variable	Categories	All	WM	NWM	WF	NWF
Heard of HgA1c	—	21.1 (14.5-27.7)	24.4 (9.0-39.8)	27.5 (6.9-48.1)	20.7 (10.9-30.5)	14.2 (5.8-22.6)
# times visited HCP for DM in past year	0-3	39.9 (32.3-47.5)	50.2 (33.2-67.2)	40.6 (20.6-60.6)	43.0 (31.0-55.0)	27.0 (15.2-38.8)
	4+	54.4 (46.6-62.2)	49.8 (32.8-66.8)	53.2 (32.6-73.8)	49.0 (36.8-61.2)	65.3 (52.5-78.1)
# times HgA1c checked in past year	0-3	57.4 (40.8-74.0)	64.8[‡]	58.7[‡]	61.4 (36.0-86.8)	41.4[‡]
	4+	32.7 (16.1-49.3)	35.2[‡]	41.3[‡]	24.3[‡]	28.4[‡]
# times feet checked in past year	0-3	63.7 (55.7-71.7)	79.2 (62.4-96.0)	61.3 (37.5-85.1)	65.4 (53.0-77.8)	51.4 (37.2-65.6)
	4+	31.0 (23.0-39.0)	16.3[‡]	35.8 (10.6-61.0)	28.6 (16.2-41.0)	41.8 (28.0-55.6)
Last eye exam	Within past year	53.9 (46.5-61.3)	49.7 (32.7-66.7)	65.1 (45.3-84.9)	58.3 (46.7-69.9)	44.7 (31.7-57.7)
	Between 1-2 years ago	16.5 (11.1-21.9)	13.7[‡]	11.0[‡]	16.0 (7.6-24.4)	23.1 (11.7-34.5)
	More than 2 years ago	20.8 (15.2-26.4)	19.9 (7.1-32.7)	18.2 (3.2-33.2)	24.2 (13.8-34.6)	19.5 (8.5-30.5)

[†] CI=confidence interval   [‡] CI boundary lies outside the range 0-100
DM=diabetes mellitus
HCP=health care provider

Note: many of these point estimates are imprecise due to the small sample numbers, even with two years' aggregated data. 1998 BRFSS data will be aggregated with 1996 and 1997 data when it becomes available; this will increase the sample N (number of diabetics) to >300 and allow more precise estimates to be generated.

Results from the 1997 IQH/MSDH survey[7]

Records on a sample of 709 Medicare beneficiaries with diabetes were reviewed; all cases were being cared for by primary care providers. Eighteen months (6 quarters) of records were reviewed on each patient. The median age of the patients was 75 years (range 42-102 years). Seven percent were <65 years of age, 84% were 65-84, and 9% were > 85 years of age. Sixty-two percent were female. 72 % were white and 27% were African American. Forty-eight percent of the patients were being managed

with oral hypoglycemics, 32% were on insulin alone, and 3% percent were on combination oral agent and insulin therapy. Twelve percent were on a diet/exercise program, and therapy in 6% of the patients was unclear from the chart.

Of the 709 cases reviewed, 6% had only one quarterly visit, 9% had two quarterly visits, 16% had 3 quarterly visits, and 69% had at least 4 quarterly visits with their physician. Nineteen percent had one HgA1c documented, 10 percent had two, 9 percent had three, 8 percent had four, and 53 percent did not have any HgA1c measurements documented. For the subset of patients that had at least 4 visits to their physician, 17 percent had only one, 9 percent had two, 8 percent had three, 12 percent had four, and 53 percent did not have any recorded HgA1c measurements. With the exception of those on combination (oral agent + insulin) therapy, the percentage of individuals without HgA1c measurements was similar among therapy groups. The percentage of patients who received at least four HgA1c measurements was similar among those using either diet and exercise (6 percent), oral agents (9 percent), or insulin (6 percent) to manage hyperglycemia. Thirty percent of those on combination therapy had four HgA1c determinations. The mean HgA1c levels were in ADA target levels for only those whose hyperglycemia was managed with diet and exercise.

Twenty-eight percent of beneficiary charts did not have documentation of lipid testing. Heterogeneity in the type of tests performed was found. Thirty-two percent had a full lipid profile (cholesterol, LDL-cholesterol, HDL cholesterol, and triglycerides) recorded during the period under review, 11 percent had a cholesterol only, and 29 percent had either an HDL, LDL, or triglyceride performed.

Documentation of testing for proteinuria was absent in 32 percent of charts. Sixty-percent had protein screened via routine urinalysis, 2 percent had testing specifically for microalbuminuria, and 5 percent had screening both by urinalysis and microalbumin testing.

Among all the beneficiaries whose care was reviewed, 25 percent received 1 foot exam, 11 percent 2 exams, 4 percent 3 exams, 6 percent 4 exams, and 54 percent did not have a foot exam recorded. For

those patients who had 4 quarterly visits with their physician, 25 percent had 1 foot exam, 13 percent had 2 exams, 5 percent had 3 exams, 8 percent had 4 exams, and 49 percent did not have an examination of the feet documented.

Twenty-four percent (159/709) of beneficiaries received a dilated eye exam during the period under review.

The results from this survey are compared with the MS-BRFSS results in Table 19.

Table 19. Comparison of results of MS-BRFSS and IQH/MSDH surveys of diabetes management performance indicators

	MS-BRFSS (1996/97)	IQH/MSDH survey (1997)
Quarterly visits to HCP for diabetes	54	69
Heard of HgA1c	21	n/d
Quarterly HgA1c test	33	47
Quarterly foot exam	31	46
Eye exam within past year	54*	24
Lipid profile (full panel)	n/d	32[†]
Testing for proteinuria	n/d	69[‡]

*70% reported an eye exam within the past 2 years
[†]An additional 11% had a cholesterol only, and 29% an HDL, LDL, or triglyceride
[‡]62%-routine test for proteinuria; 2%-test for microalbuminuria; 5%-test for both
n/d = not done
HCP=health care provider

Flu and pneumococcal vaccination levels in Mississippi adults with and without diabetes

Persons with diabetes are at increased risk of developing complications from influenza and pneumococcal (PC) infection, and are about three times more likely to die from these complications. Mortality is particularly high when additional risk factors coexist, e.g., CVD and age over 65. CDC strongly recommends that persons with diabetes receive a flu shot before the start of the flu season (November through March). Immunization against PC infection is also recommended. Both shots can be given at the same visit, and are safe and effective; for example, it is estimated that up to 80% of deaths from flu could be prevented with a flu shot. Family members and other close contacts of persons with diabetes should also be immunized to prevent transmission of infection to those at higher risk.

Flu and PC immunization levels are low in Mississippi. In 1997, data from the MS-BRFSS indicated that less than half (46%) of persons with diabetes surveyed reported having had a flu shot within the past 12 months. This is up from 1995 (37%), but means that, at a conservative estimate, approximately 75,000 persons with diabetes in Mississippi are unimmunized. Only 35% of nonwhite persons with diabetes reported having had a flu shot within the past 12 months, compared to 57% of white persons with diabetes (Figure 10). Flu immunization rates in whites have increased steadily in the period 1993-1997, but rates in nonwhites have not maintained the same improvement.

27% of persons with diabetes surveyed reported having had ever had a PC shot. Only 12% of nonwhite persons with diabetes reported having ever had a PC shot, compared to 41% of white persons with diabetes (Figure 11). As with flu immunization rates, PC immunization rates in whites have increased steadily, whereas rates in nonwhites remain very low.

Figure 10. Influenza immunization levels among persons with diabetes, Mississippi, 1993-97.
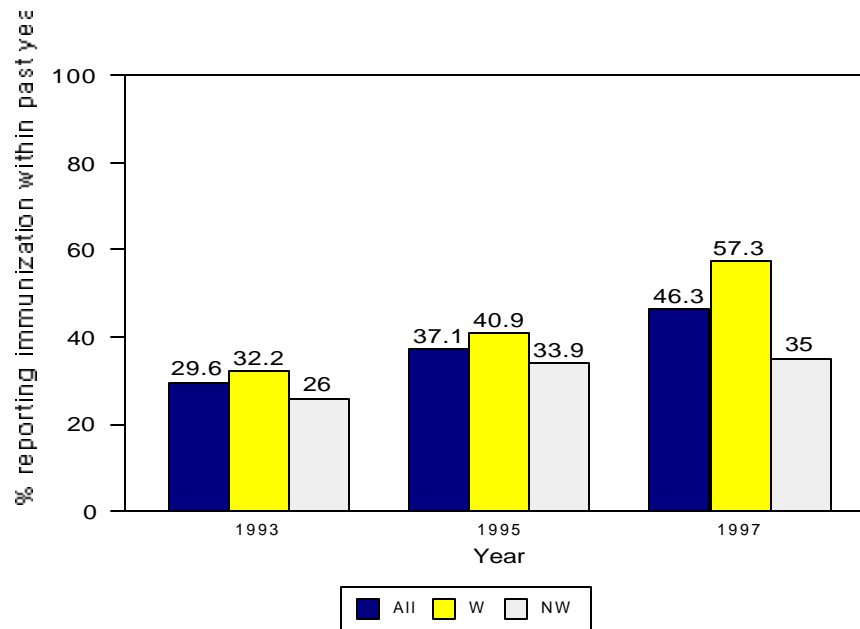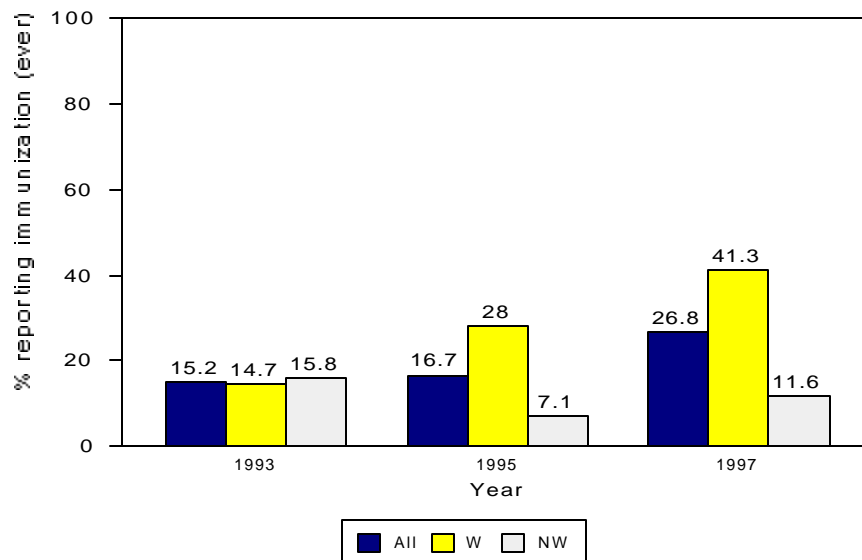

Figure 11. PC immunization levels among persons with diabetes, Mississippi, 1993-97.

Barriers to Diabetes Prevention and Care in Mississippi

Barriers to diabetes prevention and care

Throughout the state, barriers to diabetes prevention and care include poverty, lack of health insurance, health manpower shortages in rural areas, a lack of professional education, a lack of public education, and a lack of emphasis on prevention and treatment of chronic disease. Unless ways are found to remove or circumvent these barriers, Mississippi will not come close to reaching the Year 2000 objectives for diabetes (see Appendix 5).

Mississippi is, and has been for many years, one of the poorest states in the nation. About 23% of its total population had income below the federal poverty level in 1994; 34% of its children lived in families below the federal poverty level. These rates are 60 % higher than the national averages. The unemployment rate is relatively high and wages tend to be low. Mississippi's per capita income in 1995 was 28% below the national average. Although the state has achieved significant improvement in income, education, and housing, it remains well below national averages in these areas. Within the public sector, programs and services for persons with diabetes have been limited by a lack of funds and resources (see Appendix 6). These and other socioeconomic problems pose major challenges to public health and the delivery of health care. The low number of health professionals and the maldistribution of health care providers, combined with the rural distribution of the population (see Box) and a lack of adequate transportation make access to health services difficult.

Mississippi is primarily a rural, agricultural state with a population of approximately 2.6 million people, dispersed throughout 82 counties and 290 incorporated cities, towns, and villages. While three-fourths of the state's citizens reside in one of these incorporated places, 52.7 percent of the population lives in areas classified as rural by the Census Bureau. Less than 20 percent of Mississippians reside in one of the eight cities with a population of 25,000 or more, and only one-third live in cities of 10,000 or more residents.

Compared to nondiabetics, a greater percentage of persons with diabetes report being unable to access a health care provider because of cost (Figure 12). The disparity between diabetics and nondiabetics has lessened in recent years, however.

Figure 12. Percent of population reporting inability to access a health care provider because of cost: comparison of diabetics and nondiabetics, Mississippi, 1991-98.
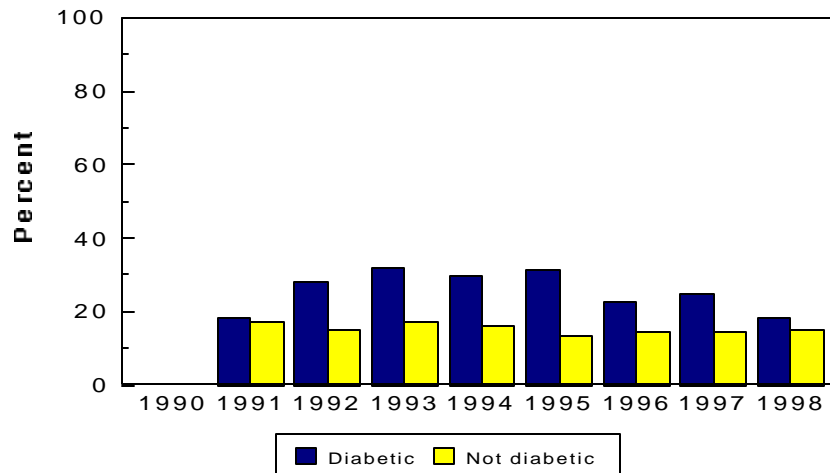
In addition, almost 20% of adult Mississippians are uninsured, although there is little difference in rates of health care coverage between diabetics and nondiabetics (Figure 13).

Figure 13. Percentage of population reporting no health care coverage: comparison of diabetics and nondiabetics, Mississippi, 1991-98.
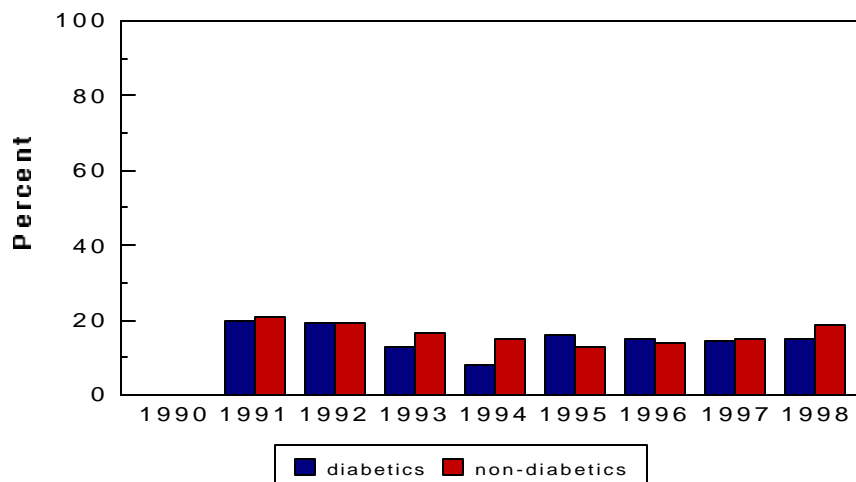
Reimbursement for diabetes care in Mississippi

In Mississippi, legislation for reimbursement for diabetes education and supplies was proposed for the first time in the 1998 legislative session. The legislation required all individual and group health insurance policies or plans to offer coverage for diabetes treatments including, but not limited to, equipment and supplies used in connection with the monitoring of blood glucose and insulin administration, and self-management training/education and medical nutrition therapy in an outpatient, inpatient, or home health setting. The language of the bill was later amended to make the offering of coverage optional. An additional change, limiting annual coverage for self-management training/education and medical nutrition therapy to $250, was also made. The bill was enacted in January 1999 and should improve access to important preventive and treatment programs for persons with diabetes in the state.

Acknowledgments

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Appendices

1. List of questions asked in the BRFSS diabetes module.

2. Prevalence of diabetes by age, race, and gender, by year, Mississippi, 1990-98.

3. Prevalence of diabetes by county, Mississippi, 1996/7.

4. Distribution of new cases of ESRD/dialysis by cause (primary diagnosis by major category), by race and gender, by year, Mississippi, 1992-98.

5. Healthy People 2000 Objectives for diabetes.

6. Public sector programs and services for diabetics in Mississippi.

Appendix 1: List of questions asked in the MS-BRFSS diabetes module

(1)   "How old were you when you were told you have diabetes?"

(2)   "Are you now taking insulin?"

(3)   "Currently, about how often do you use insulin?"

(4)   "About how often do you check your blood for glucose or sugar?"

(5)   "Have you ever heard of glycosylated hemoglobin or hemoglobin "A one C"?"

(6)   "About how many times in the last year have you seen a doctor, nurse, or other health professional for your diabetes?"

(7)   "About how many times in the last year has a doctor, nurse, or other health professional checked you for glycosylated hemoglobin or hemoglobin "A one C"?"

(8)   "About how many times in the last year has a health professional checked your feet for any sores or irritations?"

(9)   "When was the last time you had an eye exam in which the pupils were dilated?"

(10)   "How much of the time does your vision limit you in recognizing people or objects across the street?"

(11)   "How much of the time does your vision limit you in reading print in a newspaper, magazine, recipe, menu, or numbers on the telephone?"

(12)   "How much of the time does your vision limit you in watching television?"

Appendix 2. Estimated prevalence of diabetes by age group, race, and gender, by year, Mississippi, 1990-98.

Table A2a. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1990.

Table A2b. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1991.

Table A2c. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1992.

Table A2d. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1993.

Table A2e. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1994.

Table A2f. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1995.

Table A2g. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1996.

Table A2h. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1997.

Table A2i. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1998.

Table A2a. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1990. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	3.4*	1.6*
	B	0.0	2.2*	1.1*
	BOTH	0.0	2.9*	1.4*
25-34	W	1.6*	2.3*	1.9*
	B	0.0	5.9*	3.1*
	BOTH	1.0*	3.7 (0.5-6.9)	2.4 (0.6-4.2)
35 - 44	W	1.0*	4.4 (0.2-8.6)	2.7 (0.3-5.1)
	B	0.0	2.0*	1.1*
	BOTH	0.7*	3.6 (0.4-6.8)	2.2 (0.4-4.0)
45-54	W	2.7*	4.3*	3.5 (0.1-6.9)
	B	16.2*	24.6 (6.8-42.4)	21.1 (7.5-34.7)
	BOTH	6.1*	10.6 (3.6-17.6)	8.4 (3.6-13.2)
55-64	W	5.9*	7.7 (2.5-12.9)	6.8 (2.6-11.0)
	B	28.6*	33.5 (17.3-49.7)	31.4 (14.4-48.4)
	BOTH	12.1 (0.5-23.7)	16.0 (9.2-22.8)	14.2 (7.8-20.6)
65+	W	14.5 (7.1-21.9)	11.8 (6.6-17.0)	12.9 (8.5-17.3)
	B	19.4 (2.2-36.6)	27.6 (15.2-40.0)	24.2 (14.0-34.4)
	BOTH	16.2 (8.6-23.8)	16.9 (11.5-22.3)	16.6 (12.2-21.0)
TOTAL	W	3.9 (1.9-5.9)	5.8 (3.8-7.8)	4.9 (3.5-6.3)
TOTAL	B	7.7 (2.1-12.9)	13.6 (9.0-18.2)	10.8 (7.4-14.2)
TOTAL	BOTH	5.0 (2.8-7.2)	8.6 (6.6-10.6)	6.9 (5.3-8.5)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2b. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1991. Numbers are % (95% CI†).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	0.0	0.0
	B	0.0	7.8*	3.9*
	BOTH	0.0	3.4*	1.7*
25-34	W	4.6*	6.7 (1.9-11.5)	5.6 (2.2-9.0)
	B	0.0	5.1*	2.7*
	BOTH	2.9*	6.0 (2.4-9.6)	4.5 (2.1-6.9)
35 - 44	W	4.3*	1.3*	2.8 (0.4-5.2)
	B	0.0	6.5*	3.6*
	BOTH	3.1*	3.0 (0.2-5.8)	3.0 (0.8-5.2)
45-54	W	1.7*	2.8*	2.2*
	B	18.2*	29.7 (11.7-47.7)	24.9 (11.5-38.3)
	BOTH	5.8*	11.1 (4.7-17.5)	8.6 (4.2-13.0)
55-64	W	11.7 (3.1-20.3)	7.6 (2.0-13.2)	9.6 (4.6-14.6)
	B	0.0	35.7 (16.7-54.7)	20.6 (7.2-34.0)
	BOTH	8.4 (1.8-15.0)	16.7 (8.7-24.7)	12.9 (7.5-18.3)
65+	W	11.2 (3.2-19.2)	12.4 (7.0-17.8)	11.9 (7.3-16.5)
	B	12.2*	24.1 (12.7-35.5)	19.1 (9.7-28.5)
	BOTH	11.5 (4.1-18.9)	16.1 (10.7-21.5)	14.2 (9.8-18.6)
TOTAL	W	5.3 (3.1-7.5)	5.5 (3.7-7.3)	5.4 (4.0-6.8)
TOTAL	B	3.8 (0.2-7.4)	15.4 (10.6-20.2)	10.2 (7.2-13.2)
TOTAL	BOTH	4.8 (2.8-6.8)	9.0 (6.8-11.2)	7.0 (5.6-8.4)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
^CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2c. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1992. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	0.0	0.0
	B	0.0	1.1*	0.6*
	BOTH	0.0	0.5*	0.2*
25-34	W	2.0*	6.5 (1.9-11.1)	4.3 (1.7-6.9)
	B	0.0	5.2*	2.9*
	BOTH	1.3*	6.0 (2.4-9.6)	3.7 (1.5-5.9)
35 - 44	W	0.5*	4.7 (0.3-9.1)	2.6 (0.2-5.0)
	B	3.5*	3.0*	3.3*
	BOTH	1.5*	4.1 (0.9-7.3)	2.8 (0.8-4.8)
45-54	W	1.6*	5.8 (1.0-10.6)	3.7 (0.9-6.5)
	B	2.4*	17.3 (4.1-30.5)	10.7 (2.7-18.7)
	BOTH	1.8*	9.1 (3.9-14.3)	5.6 (2.6-8.6)
55-64	W	6.9 (0.5-13.3)	12.1 (3.7-20.5)	9.7 (4.3-15.1)
	B	16.2*	38.0 (16.6-59.4)	29.0 (13.8-44.2)
	BOTH	9.1 (2.5-15.7)	19.3 (10.1-28.5)	14.6 (8.6-20.6)
65+	W	5.9*	14.6 (8.2-21.0)	11.2 (6.4-16.0)
	B	34.0 (14.6-53.4)	23.2 (11.2-35.2)	27.4 (17.2-37.6)
	BOTH	13.9 (5.9-21.9)	17.0 (11.2-22.8)	15.8 (11.2-20.4)
TOTAL	W	2.6 (1.0-4.2)	7.7 (5.3-10.1)	5.2 (3.8-6.6)
TOTAL	B	7.1 (3.1-11.1)	11.6 (7.4-15.8)	9.6 (6.8-12.4)
TOTAL	BOTH	3.9 (2.3-5.5)	9.0 (7.0-11.0)	6.6 (5.2-8.0)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.

[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2d. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1993. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	1.2*	0.6*
	B	0.0	0.0	0.0
	BOTH	0.0	0.7*	0.3*
25-34	W	2.7*	1.2*	2.0*
	B	0.8*	2.0*	1.5*
	BOTH	2.1*	1.5*	1.8*
35 - 44	W	3.2*	6.6 (1.6-11.6)	4.9 (1.9-7.9)
	B	0.0	7.4 (1.2-13.6)	4.0 (0.6-7.4)
	BOTH	2.2*	6.9 (2.9-10.9)	4.6 (2.2-7.0)
45-54	W	3.2*	3.6*	3.4 (0.8-6.0)
	B	5.5*	6.5*	6.0*
	BOTH	3.7 (0.1-7.3)	4.5 (0.9-8.1)	4.1 (1.5-6.7)
55-64	W	10.8 (3.0-18.6)	14.8 (7.0-22.6)	12.9 (7.5-18.3)
	B	7.1*	33.3 (11.3-55.3)	22.6 (8.0-37.2)
	BOTH	10.0 (3.2-16.8)	20.0 (11.6-28.4)	15.4 (10.0-20.8)
65+	W	17.3 (8.3-26.3)	7.9 (3.7-12.1)	11.6 (7.2-16.0)
	B	23.5 (1.7-45.3)	22.2 (11.0-33.4)	22.7 (11.7-33.7)
	BOTH	19.1 (10.3-27.9)	12.0 (7.6-16.4)	14.8 (10.4-19.2)
TOTAL	W	5.8 (3.6-8.0)	5.8 (4.0-7.6)	5.8 (4.4-7.2)
TOTAL	B	4.7 (0.9-8.5)	9.7 (6.1-13.3)	7.7 (4.9-10.1)
TOTAL	BOTH	5.5 (3.5-7.5)	7.1 (5.3-8.9)	6.3 (4.9-7.7)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.

[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2e. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1994.
Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	0.0	0.0
	B	0.0	0.0	0.0
	BOTH	0.0	0.0	0.0
25-34	W	0.0	1.8*	0.9*
	B	0.0	2.5*	1.4*
	BOTH	0.0	2.1*	1.1*
35 - 44	W	1.4*	2.0*	1.7*
	B	3.7*	5.4*	4.6 (0.8-8.4)
	BOTH	2.1 (0.1-4.1)	3.2 (0.4-6.0)	2.7 (0.9-4.5)
45-54	W	7.2 (1.2-13.2)	2.0*	4.6 (1.4-7.8)
	B	11.7*	19.2 (5.0-33.4)	15.9 (5.7-26.1)
	BOTH	8.3 (2.7-13.9)	6.9 (2.1-11.7)	7.6 (4.0-11.2)
55-64	W	11.5 (3.1-19.9)	1.9*	6.4 (2.0-10.8)
	B	28.8 (3.4-54.2)	14.2*	20.2 (6.2-34.2)
	BOTH	15.5 (7.1-24.3)	5.4 (0.4-10.4)	10.1 (5.1-15.1)
65+	W	15.7 (7.1-24.3)	9.1 (4.7-13.5)	11.7 (7.5-15.9)
	B	12.1*	31.1 (17.5-44.7)	23.8 (13.6-34.0)
	BOTH	14.7 (7.5-21.9)	15.4 (10.2-20.6)	15.1 (10.7-19.5)
TOTAL	W	5.3 (3.1-7.5)	3.3 (1.9-4.7)	4.2 (3.0-5.4)
TOTAL	B	6.3 (2.7-9.9)	10.6 (6.6-14.6)	8.7 (5.9-11.5)
TOTAL	BOTH	5.6 (3.6-7.6)	5.8 (4.2-7.4)	5.7 (4.5-6.9)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2f. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1995. Numbers are % (95% CI†).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	1.2*	0.6*
	B	0.0	4.4*	2.3*
	BOTH	0.0	2.6*	1.3*
25-34	W	0.0	0.9*	0.5*
	B	0.0	0.9*	0.5*
	BOTH	0.0	0.9*	0.5*
35 - 44	W	1.3*	2.7*	2.0 (0.2-3.8)
	B	0.0	12.1 (3.9-20.3)	6.5 (1.9-11.1)
	BOTH	0.9*	6.1 (2.5-9.7)	3.5 (1.5-5.5)
45-54	W	2.3*	4.2 (0.2-8.2)	3.3 (0.7-5.9)
	B	14.5*	16.5 (2.3-30.7)	15.6 (4.2-27.0)
	BOTH	5.3*	7.8 (2.6-13.0)	6.6 (2.8-10.4)
55-64	W	6.7 (0.5-12.9)	6.0 (0.4-11.6)	6.3 (2.3-10.3)
	B	0.0	33.6 (15.4-51.8)	19.8 (7.8-31.8)
	BOTH	5.1 (0.5-9.7)	14.1 (6.7-21.5)	9.9 (5.3-14.5)
65+	W	11.3 (3.9-18.7)	14.1 (8.9-19.3)	13.0 (8.8-17.2)
	B	22.9 (2.1-43.7)	34.4 (20.4-48.4)	29.9 (17.5-42.3)
	BOTH	14.6 (6.6-22.6)	20.0 (14.2-25.8)	17.8 (13.0-22.6)
TOTAL	W	3.3 (1.7-4.9)	5.4 (3.6-7.2)	4.4 (3.2-5.6)
TOTAL	B	5.1 (0.9-9.3)	14.7 (10.3-19.1)	10.4 (7.2-13.6)
TOTAL	BOTH	3.8 (2.0-5.6)	8.6 (6.6-10.6)	6.4 (5.0-7.8)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
^CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2g. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1996. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	0.0	0.0
	NW	0.0	0.0	0.0
	BOTH	0.0	0.0	0.0
25-34	W	5.4 (0.2-10.6)	0.5*	3.0 (0.2-5.8)
	NW	0.0	1.8*	1.0*
	BOTH	3.4 (0.0-6.8)	1.0*	2.2 (0.4-4.0)
35 - 44	W	2.2*	2.0*	2.1 (0.3-3.9)
	NW	3.9*	4.4*	4.2 (0.0-8.4)
	BOTH	2.8*	2.9 (0.7-5.1)	2.8 (1.0-4.6)
45-54	W	5.3*	5.3 (1.1-9.5)	5.3 (1.5-9.1)
	NW	16.4*	9.8 (1.8-17.8)	12.7 (2.9-22.5)
	BOTH	8.2 (1.2-15.2)	6.7 (2.9-10.5)	7.4 (3.6-11.2)
55-64	W	14.8 (5.2-24.4)	4.5 (0.1-8.9)	9.5 (4.3-14.7)
	NW	23.5 (3.5-43.5)	27.7 (10.3-45.1)	26.0 (13.2-38.8)
	BOTH	16.8 (8.0-25.6)	11.0 (4.8-17.2)	13.7 (8.5-18.9)
65+	W	8.3 (1.9-14.7)	12.7 (7.1-18.3)	11.0 (6.8-15.2)
	NW	10.7*	24.0 (12.2-35.8)	19.0 (10.0-28.0)
	BOTH	8.9 (3.1-14.7)	15.9 (10.7-21.2)	13.2 (9.4-17.0)
TOTAL	W	5.7 (3.3-8.1)	4.8 (3.0-6.6)	5.3 (3.9-6.7)
TOTAL	NW	6.1 (2.3-9.9)	9.1 (5.9-12.3)	7.8 (5.4-10.2)
TOTAL	BOTH	5.8 (3.8-7.8)	6.3 (4.7-7.9)	6.1 (4.9-7.3)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2h. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1997. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	0.0	0.0	0.0
	B	0.0	0.0	0.0
	BOTH	0.0	0.0	0.0
25-34	W	0.0	1.8*	0.9*
	B	4.1*	0.0	1.9*
	BOTH	1.6*	1.0*	1.3*
35 - 44	W	1.5*	1.3*	1.4*
	B	7.1*	2.3*	4.4*
	BOTH	3.4*	1.7*	2.5*
45-54	W	3.3*	9.5 (3.3-15.7)	6.4 (2.8-10.0)
	B	19.8 (6.6-33.0)	16.4 (4.6-28.2)	17.9 (9.1-26.7)
	BOTH	7.7 (2.1)	11.7 (5.9-17.5)	9.7 (5.9-13.5)
55‑64	W	8.9 (1.1-16.7)	11.0 (3.8-18.2)	10.0 (4.4-15.6)
	B	0.0	30.5 (13.5-47.5)	17.1 (6.1-28.1)
	BOTH	6.7 (0.7-12.7)	16.4 (9.0-23.8)	11.9 (6.9-16.9)
65+	W	7.9 (0.9-14.9)	10.9 (5.7-16.1)	9.7 (5.5-13.9)
	B	29.0 (9.2-48.8)	18.6 (8.4-28.8)	22.7 (13.1-32.3)
	BOTH	14.0 (6.4-21.6)	13.1 (8.3-17.9)	13.4 (9.2-17.6)
TOTAL	W	3.3 (1.5-5.1)	6.1 (4.1-8.1)	4.7 (3.3-6.1)
TOTAL	B	8.9 (4.1-13.7)	8.5 (5.3-11.7)	8.7 (6.1-11.3)
TOTAL	BOTH	5.1 (3.1-7.1)	6.9 (5.3-8.5)	6.1 (4.7-7.5)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
[^]CI=confidence interval   *95% CI boundary exceeds 0 or 100.

Table A2i. Estimated prevalence of diabetes by age group, race, and gender, Mississippi, 1998. Numbers are % (95% CI[†]).

ESTIMATED DIABETES PREVALENCE (%)				
AGE GROUP	RACE GROUP	MALE	FEMALE	TOTAL (BOTH GENDERS)
18 - 24	W	1.4*	0.0	0.7*
	B	2.4*	0.0	1.2*
	BOTH	1.9*	0.0	0.9*
25-34	W	6.7*	1.4*	4.1*
	B	0.0	2.8*	1.5*
	BOTH	4.0*	2.0*	3.0 (0.4-5.6)
35 - 44	W	2.0*	5.8 (2.2-9.4)	3.9 (1.7-6.1)
	B	5.6*	9.2 (2.8-15.6)	7.6 (3.2-12.0)
	BOTH	3.2 (0.6-5.8)	7.2 (3.8-10.6)	5.3 (3.1-7.5)
45-54	W	6.8 (1.6-12.0)	8.5 (3.5-13.5)	7.7 (4.1-11.3)
	B	15.3 (3.3-27.3)	14.0 (5.0-23.0)	14.6 (7.2-22.0)
	BOTH	9.9 (4.7-15.1)	10.1 (5.7-14.5)	10.1 (6.7-13.5)
55-64	W	9.7 (4.1-15.3)	6.4 (2.0-10.8)	8.0 (4.4-11.6)
	B	5.9*	12.1 (2.1-22.1)	9.4 (1.8-17.0)
	BOTH	8.8 (3.6-14.0)	8.0 (3.8-12.2)	8.4 (5.2-11.6)
65+	W	17.6 (9.6-25.6)	13.6 (6.8-20.4)	15.2 (10.0-20.4)
	B	14.8 (0.4-29.2)	31.2 (21.0-41.4)	25.1 (16.5-33.7)
	BOTH	16.9 (9.9-23.9)	18.5 (12.9-24.1)	17.9 (13.5-22.3)
TOTAL	W	7.3 (4.9-9.7)	6.7 (4.5-8.9)	7.0 (5.4-8.6)
TOTAL	B	6.1 (2.9-9.3)	10.7 (7.7-13.7)	8.7 (6.5-10.9)
TOTAL	BOTH	7.0 (5.0-9.0)	8.2 (6.4-10.0)	7.6 (6.4-8.8)

Note: these are weighted age-/gender-/race-specific prevalence estimates from the Behavioral Risk Factor Surveillance System (BRFSS). All estimates are rounded to one decimal place.
^CI=confidence interval   *95% CI boundary exceeds 0 or 100

Appendix 3: Prevalence of self-reported diabetes by county, Mississippi 1996/97.

	County	Number sampled	Number with diabetes	Prevalence of diabetes (%)
1	Adams	n/a	n/a	n/a
2	Alcorn	24	2	8.3
3	Amite	6	2	n/d
4	Attala	26	3	11.5
5	Benton	6	0	n/d
6	Bolivar	39	3	7.7
7	Calhoun	18	1	n/d
8	Carroll	14	1	n/d
9	Chickasaw	17	0	n/d
10	Choctaw	11	0	n/d
11	Claiborne	8	2	n/d
12	Clarke	24	2	8.3
13	Clay	23	1	4.4
14	Coahoma	5	1	n/d
15	Copiah	42	3	7.1
16	Covington	37	2	5.4
17	DeSoto	122	9	7.4
18	Forrest	63	3	4.8
19	Franklin	11	0	n/d
20	George	19	0	n/d
21	Greene	12	0	n/d
22	Grenada	35	3	8.6
23	Hancock	53	4	7.6
24	Harrison	172	10	5.8
25	Hinds	345	23	6.7
26	Holmes	18	2	n/d

	County	Number sampled	Number with diabetes	Prevalence of diabetes (%)
27	Humphreys	13	2	n/d
28	Issaquena	1	0	n/d
29	Itawamba	35	1	2.9
30	Jackson	187	10	5.4
31	Jasper	36	4	11.1
32	Jefferson	12	3	n/d
33	Jeff Davis	6	0	n/d
34	Jones	94	7	7.5
35	Kemper	17	2	n/d
36	Lafayette	58	3	5.2
37	Lamar	56	1	1.8
38	Lauderdale	106	8	7.6
39	Lawrence	17	0	n/d
40	Leake	27	3	11.1
41	Lee	83	3	3.6
42	Leflore	33	4	12.1
43	Lincoln	45	0	0.0
44	Lowndes	56	1	1.8
45	Madison	120	11	9.2
46	Marion	22	1	4.6
47	Marshall	51	5	9.8
48	Monroe	22	1	4.6
49	Montgomery	17	2	n/d
50	Neshoba	32	1	3.1
51	Newton	24	4	16.7
52	Noxubee	12	1	n/d
53	Oktibbeha	44	2	4.6
54	Panola	31	5	16.1

	County	Number sampled	Number with diabetes	Prevalence of diabetes (%)
55	Pearl River	57	5	8.8
56	Perry	14	2	n/d
57	Pike	17	0	n/d
58	Pontotoc	13	2	n/d
59	Prentiss	19	3	n/d
60	Quitman	10	2	n/d
61	Rankin	137	7	5.1
62	Scott	26	3	11.5
63	Sharkey	8	1	n/d
64	Simpson	42	2	4.8
65	Smith	13	2	n/d
66	Stone	12	0	n/d
67	Sunflower	31	6	19.4
68	Tallahatchie	14	1	n/d
69	Tate	27	1	3.7
70	Tippah	24	2	8.3
71	Tishomingo	15	1	n/d
72	Tunica	11	0	n/d
73	Union	38	2	5.3
74	Walthall	30	0	0.0
75	Warren	2	0	n/d
76	Washington	81	6	7.4
77	Wayne	31	2	6.5
78	Webster	7	0	n/d
79	Wilkinson	9	1	n/d
80	Winston	32	1	3.1
81	Yalobusha	24	2	8.3
82	Yazoo	26	1	3.9

Note: data missing for Adams County   n/d=not done because sample size too small

Appendix 4: Distribution of new cases of ESRD/dialysis by cause (primary diagnosis by major category), by race and gender, by year, Mississippi, 1992-98.

DM=diabetes; HT=hypertension; GN=glomerulonephritis; Cystic=cystic, hereditary, and congenital diseases

A. Males

Table A4a. White males. All figures are % (not age adjusted).

	1992	1993	1994	1995	1996	1997	1998
Diabetes	35.2	26.1	29.1	35.1	37.6	39.4	31.0
HT	31.7	32.7	37.1	24.3	22.1	23.9	30.4
GN	14.5	21.6	13.9	10.1	18.2	16.5	13.6
Cystic	4.8	6.5	3.3	5.4	2.2	4.1	3.8
Other	13.8	13.1	16.6	25.0	19.9	16.1	21.2

Table A4b. Nonwhite males. All figures are % (not age adjusted).

	1992	1993	1994	1995	1996	1997	1998
Diabetes	28.4	30.2	24.7	30.1	37.3	35.0	33.0
HT	47.2	46.8	54.4	43.8	42.5	45.1	43.3
GN	14.2	12.8	11.0	11.6	7.5	11.7	14.1
Cystic	0.0	0.4	0.4	1.1	1.1	0.4	0.3
Other	10.1	9.8	9.5	13.4	11.6	7.9	9.3

B. Females

DM=diabetes; HT=hypertension; GN=glomerulonephritis; Cystic=cystic, hereditary, and congenital diseases

Table A4c. White females. All figures are % (not age adjusted).

	1992	1993	1994	1995	1996	1997	1998
Diabetes	36.4	35.6	40.8	42.1	42.3	37.9	57.4
HT	23.7	28.8	30.8	23.6	22.1	24.2	17.3
GN	21.2	16.1	17.5	15.0	11.4	10.6	9.9
Cystic	5.1	5.9	5.0	5.0	4.7	6.8	1.9
Other	13.6	13.6	5.8	14.3	19.5	20.5	13.6

Table A4d. Nonwhite females. All figures are % (not age adjusted).

	1992	1993	1994	1995	1996	1997	1998
Diabetes	44.9	44.4	53.4	51.0	56.0	49.7	53.0
HT	37.3	34.3	31.9	28.5	29.9	36.3	32.0
GN	10.6	10.8	8.1	5.6	5.3	5.8	6.5
Cystic	1.1	2.1	1.6	0.7	1.1	1.1	0.5
Other	6.1	8.4	5.0	14.2	7.7	7.1	8.0

Appendix 5: Healthy People 2000 Objectives for diabetes.[18]

AIAN=American Indian/Alaskan Native
ESRD=end stage renal disease
LEA=lower extremity amputation

Objective	Obj. No.	Baseline (Year)	1990	1991	1992	1993	1994	1995	1996	Target 2000
Diabetes-related deaths (age adjusted per 100,000)	17.9	38 (1986)	38	38	38	40	40	40	41	34
Blacks		67 (1986)	71	71	71	74	73	76	76	58
AIAN		46 (1986)	53	51	57	60	58	63	63	41
Diabetes-related complications among people with diabetes	17.10									
ESRD due to diabetes (per 1,000)		1.5 (1987)	2.5	2.5	2.7	2.4	3.3	3.4	4.1	1.4
Blindness due to diabetic eye disease		2.2 (1987)	2.5	2.4	2.3	2.1	2.2	---	---	1.4
LEA due to diabetes		8.2 (1987)	8.6	6.2	7.8	7.3	8.6	9.4	11.1	4.9
Perinatal mortality (among infants of females with established diabetes)		5% (1988)	---	---	---	---	---	---	---	2%
Major congenital malformations		8% (1988)	---	---	---	---	---	---	---	4%

Objective	Obj. No.	Baseline (Year)	1990	1991	1992	1993	1994	1995	1996	Target 2000
ESRD due to diabetes among Blacks with diabetes (per 1,000)		2.2 (1983-86)	3.1	---	---	5.7	5.0	5.2	5.5	2.0
ESRD due to diabetes among AIAN with diabetes (per 1,000)		2.1 (1983-86)	4.2	4.4	5.4	---	---	---	---	1.9
LEA due to diabetes among Blacks with diabetes (per 1,000)		9.0 (1987)	8.0	11.1	8.6	8.6	9.1	10.2	10.1	6.1
People with diabetes (18 years and over) who had a dilated eye exam in the past year	17.23	49% (1989)	---	52%	---	---	---	---	---	70%
Diabetes incidence and prevalence	17.11									
Incidence of diabetes (total population, per 1,000)		2.9 (1986-88)	2.6	2.5	2.4	2.8	3.1	3.4	3.1	2.5
Prevalence of diabetes (total population, per 1,000)		28 (1986-88)	26	27	28	30	30	31	31	25
Prevalence of diabetes (AIAN, per 1,000)		69 (1987)	---	---	---	---	---	---	90	62
Prevalence of diabetes (Blacks (all ages), per 1,000)		36 (1986-88)	36	36	36	38	40	42	44	32
Patient education for people with diabetes	17.14									
People with diabetes (classes)		32% (1983-84)	33%	39%	---	43%	---	---	---	75%
People with diabetes (counseling)		68% (1983-84)	---	---	---	---	---	---	---	---
Blacks with diabetes (classes)		34% (1991)	---	---	---	50%	---	---	---	75%

Appendix 6: Public sector programs and services for diabetics in Mississippi

MSDH Insulin Program

The Mississippi State Department of Health maintains a program which provides insulin, syringes, and diabetes testing supplies at no charge to type 1 diabetics 21 years of age and younger and gestational diabetics of any age. In FY 1998, the Insulin Program served 455 patients.

Supportive services for both type 1 and type 2 diabetics are available through the county health departments, including screening and referral for definitive diagnosis; problem assessment and appropriate referral; joint medical management (with the patient's own physician); and health education, provision of informational materials, and diet counseling. In FY 1998, county health departments reported more than 3,000 diabetic monitoring visits.

There are no specific MSDH treatment programs or services for older, non-insulin-dependent diabetics (who constitute more than 90% of all diabetics in the state).

Diabetes Control and Prevention Program

In 1994, the MSDH entered into a cooperative agreement with the CDC to establish a statewide Diabetes Control and Prevention Program. Funds have been used to develop a chronic disease coalition (the Mississippi Chronic Illness Coalition), which has a major focus on diabetes, and to build epidemiological capacity in the area of diabetes, so that diabetes prevalence, morbidity, and mortality can be better estimated. In addition, planning is underway for a diabetes resource center. Funds cannot be used for direct patient services, and currently no expansion of clinical diabetes services is planned.